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theless are large enough to reflect and also to polarize light. These luminescent solutions are called pseudo-solutions. In true colloidal solutions the maximum diameter of the particles was found to be $5\ \mu\mu$, that is about ten times as large as the mean diameter of molecules. This raises the question as to whether there is any real boundary between true solutions and colloidal solutions. If not, substances with very large molecular weight ought to give evidence when in solution of interruption of a ray of light similar to that of colloidal solutions. It was found that water rendered optically clear was not affected by the addition of urea, acetamid, methyl or ethyl alcohol, but light reflected vertically from a solution of saccharose (mol. wt. 342) and raffinose (mol. wt. 504) was polarized. Strong luminescence was given by a solution of phosphomolybdic acid. The authors consider it probable that with sufficiently strong source of light even substances of lower molecular weight would show reflection from the dissolved molecules.

The second paper, whose co-author is R. P. Van Calcar, is on the effect of centrifugal force on dissolved substances. The solutions were submitted to a centrifugal force 400 times that of gravity. Under these conditions a one fifth normal solution of potassium iodid showed after three hours pure water in the upper portion, a concentration of 0.1 normal immediately below, 0.32 normal at the top of the lower half and one fourth normal at the bottom. In a number of other cases solutions became manifestly more concentrated at the periphery. In a solution containing 8.78 per cent. of sodium sulfate after five hours rotation a considerable amount of Glauber's salts, $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, had crystallized out and the remaining solution contained only 5.54 per cent. of sodium sulfate. These results are the more important, as it has generally been accepted since the negative experiments of Gay-Lussac, that the molecules in a true solution were unaffected by gravity, and hence were in a different state from those in colloidal or pseudo solutions, and it also confirms from a different point of view the results of Lobry de Bruyn and Wolff described above.

J. L. H.

SOCIAL AND ECONOMIC SCIENCE.

UNIVERSITY COMPETITION FOR GRADUATE STUDENTS.

IN his latest annual report President Hadley, of Yale, calls attention to this phase of university effort in the following statement: "For some time past many of the universities of the country have been engaged in a rather unfortunate competition for graduate students. There was in certain quarters a tendency to measure the success and usefulness of an institution by the numbers enrolled for graduate study. Under the influence of these ideas there has been a strong tendency to treat graduate students in the present generation as divinity students were treated a generation ago—giving them not only free tuition, but a great many other pecuniary inducements to pursue special studies for the degree of doctor of philosophy.

"This course of action involves an inversion of the true order of things. If you have real interest in science and literature you will probably have a number of men pursuing courses for the degree of doctor of philosophy; but it by no means follows that if you have a number of men pursuing courses for the doctorate of philosophy you will have a corresponding amount of interest in science and literature. On the contrary, this attempt to subsidize graduate students too often increases numbers at the expense of quality; and so far as it does this is bad. A good graduate student is about the best man that we have in the university; a poor graduate student is about the worst man. The same conditions which allow a man to rise above the average of his fellows if he has the ability and stimulus in himself allow him to fall below his fellows if he has not that ability and stimulus. * * * If the numbers of the graduate students increase instead of diminish it will be a source of congratulation; but it will be far better to submit to some loss of numbers than to continue a form of competition which is prejudicial to the quality of the students, wasteful of the resources of the university, and based upon an imperfect appreciation of the purposes and scope of university work. A uni-

versity exists for creating and maintaining standards, intellectual and moral. In order to have the highest intellectual standards, it must be a place where progressive thought is pursued and cultivated. But the number of men who claim to be occupied with the pursuit of progressive thought is no sure criterion of the degree to which the university is upholding such standards."

SERVICE OF SCIENCE IN SOCIAL WORK.

THE application of the laboratory method of training to the study of social subjects of vital importance to the community, especially to municipal communities, is well exemplified by the School of Philanthropy, conducted by the Charity Organization Society of New York City.

The Committee on Philanthropic Education, under whose auspices the summer school has been held in New York City for six weeks of each summer for the past six years, established last year a winter course, primarily intended for those who are engaged in practical social work, and who could give only a limited amount of time to lectures, class exercises and study. For this purpose the course was entirely successful, 159 students being registered, 121 eligible for, and 50 receiving, certificates.

It was later decided greatly to extend the scope of this course, and to offer a sufficient amount of instruction to justify those who enroll in it in devoting their entire time to it during the academic year.

Arrangements were made for extended courses of lectures on each of the more important branches of social work, such as: The care of families in their homes; the care of dependent children, both in institutions and by placing-out agencies; the care of the sick in hospitals, by dispensaries, by district nurses, etc.; state and municipal charities; reformatories, prisons and asylums; official inspection, sanitary and industrial; neighborhood work, civic improvement and educational advance.

The courses for the coming winter consist of from four to twelve lectures each, and include discussions by students, and opportuni-

ties for personal consultation with instructors. There will be, in addition, single lectures by eminent persons, dealing with particular institutions or problems upon which they are especially qualified to speak.

The enrollment will be limited to the following classes:

1. Men and women who have been engaged for one year or more in some form of philanthropic activity, as a profession, and who desire to improve their knowledge of the methods of social service.

2. College graduates who have taken at least one year's work in social economics or some kindred subject.

3. Senior students in theological seminaries or medical colleges who may wish, by special arrangement, to take one or more courses of lectures.

4. Others who satisfy the director by some indication of fitness, that they are likely to profit by the opportunities of the school.

One of the best services such enterprises render to society is the diffusion of the discoveries, often of a preventive character of course, of the various branches of natural science among the very people who are in most need of them. The distance between the scientific laboratory and the 'submerged tenth' is very great indeed; but the well-trained social worker does a very large share in bridging that distance and, therefore, in proving the value of science to the general welfare. The whole propaganda of sanitation depends on this process of enlightening popular sentiment to its own advantage, and thus increasing the economic efficiency of the less capable portion of the population.

VIRGINIA'S PROGRAM OF EDUCATIONAL PURPOSES.

THE Cooperative Education Commission of Virginia, which was organized last March, has formulated a policy under the title of a 'program of purposes' which have recently been made public. These purposes constitute a comprehensive scheme of objects in which it is desired that all the varied educational interests of the state should unite. They are as follows:

1. A nine months' school for every child.
2. A high school within reasonable distance of every child.

3. Well-trained teachers for all public schools.

4. Efficient supervision of schools.

5. The introduction of agricultural and industrial training into the schools.

6. The promotion of libraries and correlation of public libraries and public schools.

7. Schools for the defective and dependent classes.

8. The organization of a citizens' education association in every county and city.

9. Local taxation.

The commission as formed is said to be a thoroughly representative one. As may be inferred from the foregoing nine objects, it has for its purpose the unification of educational forces, with a view of utilizing their combined wisdom and strength in reenforcing the efforts of the state and local authorities in the matter of perfecting the public school system of Virginia. Such a movement as this is particularly promising on account of the hitherto independent development of educational institutions without that degree of correlation which would be advantageous to all.

A FUND of \$30,000 has been secured through the efforts of Professor Richard T. Ely, of Wisconsin University, for the purpose of making an extended inquiry into the industrial history of the United States in its bearings upon the labor problems. The length of time to be occupied will probably extend to five years. Professor John R. Commons will be associated with Professor Ely, together with a corps of assistants.

THE national budget of France for the year 1904 carries an expenditure of \$45,914,700 for public instruction and the fine arts, compared with \$38,600,000 in 1894, or an increase of 19 per cent. in ten years.

JOHN FRANKLIN CROWELL,

Secretary, Section I, A. A. A. S.

WASHINGTON, D. C.

*OPPORTUNITIES IN ANTHROPOLOGY AT
THE WORLD'S FAIR.*

Now that the Department of Anthropology and cognate branches of the Exposition are

well under way, it has become clear that the Louisiana Purchase Exposition affords unequalled opportunities for ethnologic study. The original plans for the department are so far fulfilled (largely by the great Philippine Exhibit, the Department of Physical Culture, etc.) as to bring to the exposition the largest assemblage of the world's peoples in the world's history. Some of the alien groups have been selected especially to represent distinct ethnic types; and nearly all the groups have been selected with special reference to culture-grade, so that every known stage of industrial and social development is typified among the peoples on the exposition grounds. Accordingly, students and teachers of anthropology in all its branches may have in St. Louis during the present summer opportunities for original and instructional work such as could not be enjoyed otherwise except at the cost in time and money of extensive journeys with attendant hardships. The exposition authorities appreciate the opportunity and undertake to afford students and teachers every facility consistent with the primary purposes of the exposition.

The department comprises sections of ethnology, illustrated chiefly by living groups, partly by collections of artifacts; Indian school work, illustrated by a model school in actual operation; archeology, illustrated by typical collections and series of aboriginal artifacts; history, illustrated especially by relics and records of the transition of the territory from the aboriginal condition to that of advanced enlightenment; anthropometry, which is devoted to apparatus and laboratory work in which the assembled physical types are measured and recorded; and psychometry, likewise devoted to apparatus and laboratory tests of sense reactions and other psychic characters of the types of mankind. The four sections last named are accommodated in the Anthropology Building in the western portion of the grounds; the Indian school is housed in a special building near by; and the alien groups of the department occupy native habitations about this building and intermediate between the extensive Philippine exhibits on the south and the Physical Culture Department on the